

CLAIMS FOR USA, TAIWAN AND S KOREA

We claim :

1. A process for contacting (a) at least one gaseous reactant and (b) at least one liquid selected from the group consisting of reactants, coolants and mixtures thereof in the presence of a fluidised bed of catalyst, which process comprises :
 - (i) fluidising with a fluidising gas, a bed of fluidisable catalyst within a fluidisation zone in a reactor, said reactor having a fluidisation zone for said bed of catalyst and means for supporting said bed of catalyst within said fluidisation zone;
 - (ii) introducing said at least one liquid into said reactor through at least one inlet located within said fluidisation zone; and
 - (iii) introducing said at least one gaseous reactant into said reactor through at least one inlet located within said fluidisation zone adjacent said support means.
2. A process as claimed in claim 1 in which said at least one inlet for liquid is located in the lower half of the fluidisation zone
3. A process as claimed in claim 1 in which said at least one inlet for liquid is located so that liquid does not impinge on any solid surfaces within the fluidisation zone.
4. A process as claimed in claim 1 in which said gaseous reactant comprises molecular oxygen containing gas.
5. A process as claimed in claim 4 in which said at least one inlet for gaseous reactant is located at a distance from said catalyst support means of greater than any potential flame length.
6. A process as claimed in claim 4 in which one or more second gaseous reactants are introduced into the reactor.
7. A process as claimed in claim 6 in which said one or more second reactants are introduced at least in part, separately from said first gaseous reactant.
8. A process as claimed in claim 6 in which said one or more second gaseous reactants are introduced as a component of the fluidising gas.
9. A process as claimed in claim 6 in which said one or more second gaseous reactants

comprises ethane, ethylene or mixtures thereof.

10. A process as claimed in claim 9 in which said liquid introduced into said reactor comprises acetic acid and there is produced vinyl acetate.

11. A process as claimed in claim 9 in which said liquid introduced into said reactor is selected from the group consisting of acetic acid, water and mixtures thereof and there is produced acetic acid by the oxidation of ethylene and/or there is produced ethylene and/or acetic acid by the oxidation of ethane.

12. A process as claimed in claim 6 in which acrylonitrile is produced by the reaction of ammonia, molecular oxygen-containing gas and a second reactant selected from the group consisting of propylene, propane and mixtures thereof.

13. A process as claimed in claim 6 in which maleic anhydride is produced by the reaction of molecular oxygen-containing gas and a second reactant selected from the group consisting of butene, butane and mixtures thereof.

14. Apparatus for fluid bed heterogeneous reactions in which (a) at least one gaseous reactant and (b) at least one liquid selected from the group consisting of reactants, coolants and mixtures thereof, are introduced into a fluidised bed of catalyst, which apparatus comprises a reactor having :

- (1) a fluidisation zone for a fluidised bed of catalyst;
- (2) means for supporting a fluidised bed of catalyst within said fluidisation zone;
- (3) at least one inlet for introducing at least one gaseous reactant into said reactor; and
- (4) at least one inlet for introducing at least one liquid selected from the group consisting of reactants, coolants and mixtures thereof into said reactor,

in which said at least one inlet for liquid is located within said fluidisation zone and said at least one inlet for gaseous reactant is located within said fluidisation zone adjacent said support means.

15. Apparatus as claimed in claim 14 in which said at least one inlet for liquid is located in the lower half of the fluidisation zone

16. Apparatus as claimed in claim 14 in which said at least one inlet for liquid is located so that liquid does not impinge on any solid surfaces within the fluidisation zone.

17. Apparatus as claimed in claim 14 in which said at least one inlet for gaseous reactant is located at a distance from said catalyst support means of greater than any potential flame length when said gaseous reactant comprises molecular oxygen containing gas.